Oil Near Fayette — *E. M. Schiwetz*

The HUMBLE WAY

NOVEMBER-DECEMBER, 1931

X-raying welds for flaws. See page 17.

The HUMBLE WAY
NOVEMBER-DECEMBER, 1951
VOL. VII No. 4

IT'S WISE TO HAVE A WILL

MARTHA Perkins came bustling from the kitchen to cast a wifely glare at the living room sofa. The battered divan looked like a small ship moored to an end-table dock. It was wreathed with pipe smoke, and unfurled at the bow end was the afternoon paper. Sam Perkins was taking his pre-supper ease.

"What," demanded Martha, "was that you just said?"

As a husband, senior grade, Sam Perkins knew when to strike his colors. He lowered his newspaper and prepared to come to terms.

"I just said," he grinned, "that Bill Edwards of our Division Office is going to drop by for supper."

His wife was placated not a whit. "And who," she asked, "is Bill Edwards, and why didn't you tell me sooner? I look a fright. The house is in a mess. And we're having salmon patties."

"Bill is one of Humble's employee relations men," Sam said. "In fact, he's the assistant regional manager in this division. And don't worry about supper. He's expecting to take pot luck. I asked him to drop by some night this week, and he just 'phoned that he could make it tonight."

"What do you want to see him about?" asked Martha. "I thought you were already pretty well up on Humble's various benefit plans."*

"I am," Sam said, "but I want his advice on making out a will."

Martha was startled. "A will?" she said. "My goodness, Sam, why do you want to make out a will? That sounds like bad luck to me."

"No, I don't think so." A thoughtful frown creased Sam's brow. "In fact, from the little I've learned on the subject, I think it's the other way around. It could mean plenty of headaches for you and the children if someday I should happen to die without a will—intestate, they call it."

"Well, I'm willing to listen," Martha said, "but right now I'd better get busy in the kitchen."

A couple of hours later supper was over in the lease pumper's cottage, and the two Perkins children, Marguerite and Sam, Jr., had scurried off to a bedside radio to stalk a villain with their favorite detective. Martha served coffee in the living room and then sat down to talk with her husband and Bill Edwards.

"Sam tells me," the employee relations man began, "that you see little need in his having a will."

Martha nodded her head and smiled. "That Sam! Sometimes I think he can hardly wait until he makes me a widow."

"It isn't that, dear," Sam protested. "I've just read of too many cases where estates became tangled up in red tape because somebody forgot to leave a will. And I just happen to feel that every man has a duty to spare his family that sort of thing."

"But those were big estates," Martha said. "Ours is pretty small-fry compared to those you've been reading about. I can't see that we have any cause for worry."

Bill Edwards reached for his brief case and started digging out some

*Security Through Individual Planning, March-April, 1951, HUMBLE WAY; If Sickness Comes, July-August, 1951, HUMBLE WAY.

papers. "You'll find plenty of people to agree with you there, Mrs. Perkins," he said. "In reality, though, it's often more important for the man with a modest estate to have a will than it is for someone who is well-to-do."

"Why is that?" asked Martha, a little surprised.

"That's because the person who inherits a small estate usually needs every penny of it. That person can least afford to pay the extra legal fees and court costs which frequently crop up where there's no will."

Mr. Edwards explained there's no escaping some legal fees whenever an

owner of property dies. But these costs usually can be considerably reduced, he said, by using a will to dispose of one's property and by naming an independent executor to serve without bond. That "independent" and "without bond" proviso is important, he added. Depending on circumstances, the savings in bonding fees and court costs alone could run from a hundred or so dollars to several thousand dollars. Mr. Edwards added, however, that if one wanted to name a third person as executor, he might, of course, want to consider having that person bonded.

"Suppose Sam here died tomorrow," he said. "In Texas, with no will, half of his estate would go to your children, and my lawyer friends tell me it always creates a problem when minors inherit property. For instance, you would have to ask the probate court to appoint you, Mrs. Perkins, guardian of Marguerite and Sam, Jr. And probably you would be required to post bond until they became of age. That would cost quite a bit of money over a period of years."

Martha had a question. Couldn't she save that money by getting some of her friends or relatives to go on her bond?

"You could," Bill Edwards said, "but it's like asking someone to go on your note. It's not only an imposition. It's also a financial hazard for whoever signs the bond."

Martha Perkins looked at her husband and smiled. "Well, maybe it isn't such a bad idea for Sam to have a will after all. Is drawing one up very complicated?"

"Not at all." Mr. Edwards peeled off a couple of papers from the sheaf he had taken from his brief case. "Here is a sample will Humble lawyers prepared a few years ago. We ran it once in a Company publication, and it proved so popular that we're still getting requests for additional copies."

Mr. Edwards handed a copy of the sample will to Sam and Martha.

"This will," he said, "leaves all of its maker's property to either the wife or husband and names an independent executor without bond. This is about all most people want, and that's true whether they have children or not."

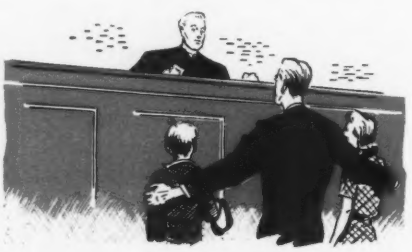
"Looks fairly simple," Sam remarked, after a casual glance.

"It is," Mr. Edwards said. "All you have to do is fill in the blanks in the presence of two witnesses who are more than fourteen years old. These witnesses, by the way, should not be beneficiaries of the will."

Martha looked up after glancing over the will. "I'm surprised," she said, "that it's so short."

"A will doesn't have to be long to be effective," the employee relations man said. "I was reading the other day where P. T. Barnum, the circus magnate, used 61 printed pages in disposing of all his property. It was actually bound in book form. Calvin Coolidge, on the other hand, left a will, written on White House stationery, which was only 23 words long.

"Even the sample will you have there could, I'm told, be put in a legal



nutshell. Something like this: 'I leave all my property to my wife, Martha, and name her independent executrix without bond.' "

"You mean that would be enough to make it legal?" Sam leaned back in his chair and concentrated his attention on the sample will. "Seems to me you'd be leaving out some important things."

"Not necessarily," Mr. Edwards said. "In the first place, you are presumed to be of sound mind and body when you make a will. And your just debts are going to be paid out of your estate whether you want them paid or

not. The important thing in your case is to dispose of all your property, to name a beneficiary or beneficiaries, and to name an executor to serve without bond. You could do all of that in one sentence, and if such a will were in your own handwriting—a holographic will, that's called—it would not even have to be witnesesd."

"I didn't know that law could be that simple," Sam said.

Mr. Edwards smiled and reached over to deposit his cup on the coffee table. "It usually isn't," he said. "It's a profession in which you'll find even the experts bumping heads. If your estate were a complicated one, I'd certainly suggest you see an attorney before making out your will. I believe, though, that the will form you have there is tailor-made for your estate."

"What about my insurance," Sam asked, "and what about the survivor benefits Martha would get from Humble? Shouldn't they be included in a will?"

Insurance, Mr. Edwards told Sam, is not considered as part of a man's estate since it is paid after his death pursuant to a contract or agreement. The same is true of the survivor benefits which Humble provides for its employees.

Will or no will, insurance—and this includes group annuity contributions under the Annuity and Thrift Plan—

goes to the designated beneficiary. And Humble's survivor benefits are distributed to an eligible recipient (usually a widow) in accordance with the Company plan. But holdings in the Thrift Fund of the Annuity and Thrift Plan, whether they be in stock or in cash, are part of an employee's estate. So is his 1932 Annuity Plan refund, representing the amount, if any, plus interest, he paid into that plan prior to 1936.

"In your case, though," Mr. Edwards said, "you probably would not want to list any of your property by name. That second paragraph in the sample will has it all wrapped up in one neat package."

Sam bent forward to place his coffee cup on the table. He took out his pipe and clamped his teeth on the stem. "Not that I intend to," he said between puffs, "but suppose I wanted to leave part of my estate to my children."

"Well, then you would have to revise paragraph two of the sample will. You could leave one-half, say, to your children, share and share alike, and the other half to Mrs. Perkins. But I'd advise you to see a lawyer if you want to do something like that."

"I just wanted to know," Sam said. He turned to his wife. "Well, dear, what do you think?"

"Mr. Edwards has convinced me," she said. "You'd better sign that will, but do go on living. It's nice having you around the house."

The Perkins' guest snapped his fingers. "There's another thing I forgot to mention," he said. "It's really about as important for you to have a will, Mrs. Perkins, as it is for Sam. It can also cause plenty of headaches when a wife dies without having made a will. You can use the same form for yours as Sam."

"I imagine you're right, Martha agreed. "But suppose Sam and I both died at the same time—in a car wreck, say."

"In legal jargon," Mr. Edwards said, "that's called simultaneous demise. A lot of people do provide for that in their wills, but the odds are all against you two dying at the same time. Once again, though, I'd want to see a lawyer before including that contingency in my will."

Sam and Martha had other questions, and Bill tried to answer them all. He told them how important it is to have one's will witnessed by persons who are permanent residents of the area. That way, should it ever be necessary to have a witness appear in court to establish the will, one's estate would be saved heavy travel expenses. He suggested drawing up a new will if a witness ever died or moved away. Should Sam and Martha ever move from Texas to another state, he advised checking their wills in the light of the laws of their new state.

"Another thing," Mr. Edwards said. "Always leave your will where it can be found. Many wills have been lost.

Others have been found in coal scuttles, in window shades, in old shoes, and in almost every other hiding place you can think of. A bereaved family should never be forced to play hide-and-seek with a will."

Sam tapped his pipe on an ash tray. "Tell you what I'm going to do, Bill. I imagine I'll make it through the night. That is—" he glanced over at Martha and grinned—"provided Martha doesn't lose her temper between now and morning. Tomorrow I'm going to get this signed and witnessed the first thing. Martha has been a fair-to-middling wife, and when my time comes, I'd like for the loose ends to be as few as possible."

"I'm glad to see you're not like Heinrich Heine, the German poet," Bill Edwards said, gathering up his papers. "He willed everything to his wife only on condition that she marry again immediately. That way, Heine said, there would be at least one man to regret his death."

"Just like a man," Martha said. Then she added: "Present company excepted, that is."

THE STATE OF TEXAS
COUNTY OF_____

KNOW ALL MEN BY THESE PRESENTS:

That I,_____, being sound in mind and body, do hereby make, declare and publish this my last Will and Testament, hereby revoking any and all wills and codicils heretofore made by me.

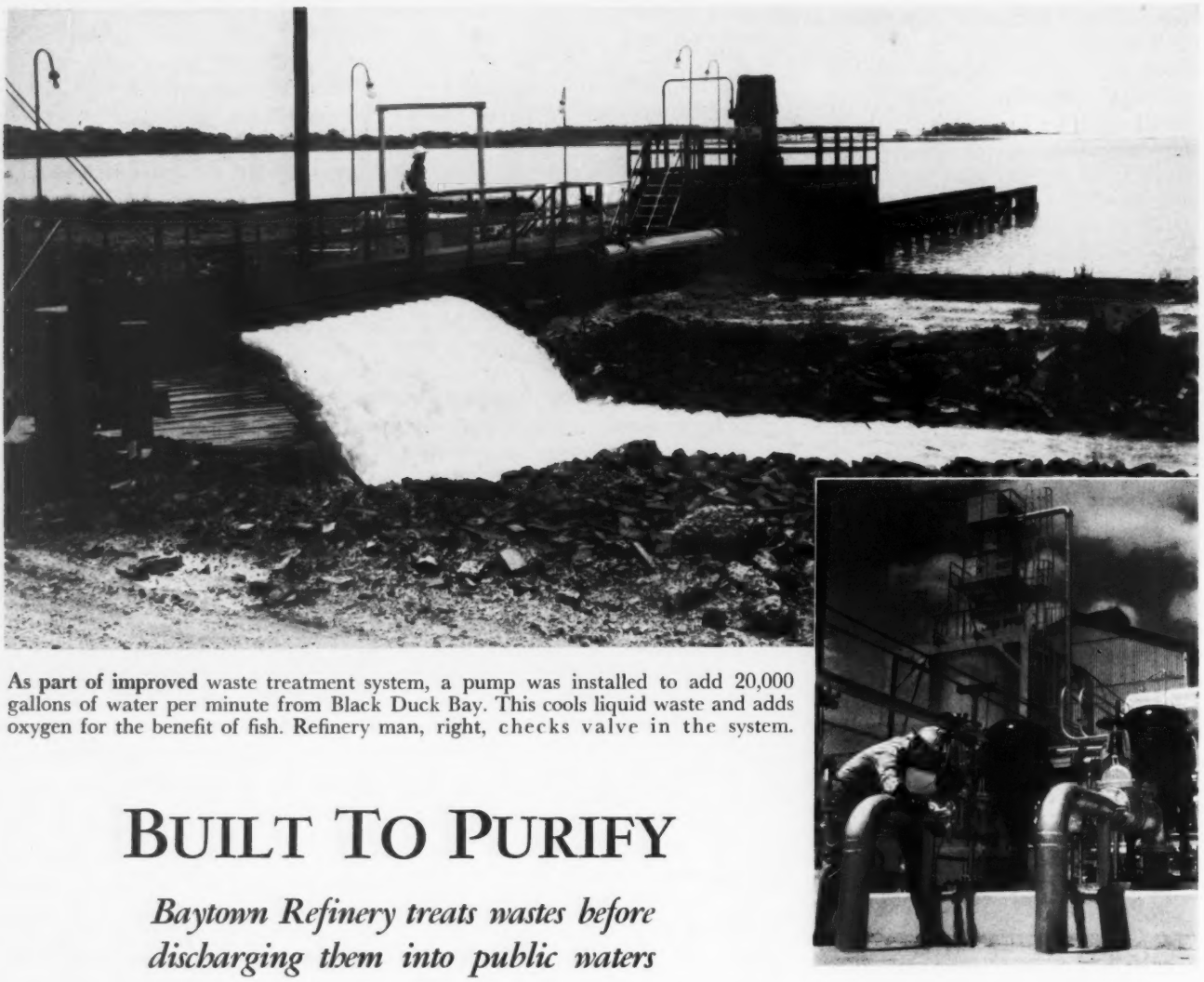
1. I desire that all of my just debts, if any, be paid by my executor out of my estate.

2. I hereby give, devise and bequeath all of the property, real, personal and mixed, which I may own or be interested in at the time of my death, to my beloved wife, _____ in fee simple.

3. I hereby designate_____ as independent executor of this Will and of my estate without bond, and desire that no further action be had in the probate or other courts in connection with this Will, or my estate, than to probate and record this Will, and to file an inventory and appraisement of my estate and a list of claims.

IN TESTIMONY WHEREOF, witness my hand hereto affixed this_____ day of_____, A.D., 19____, at _____, in the presence of _____ and _____ whom I have requested to affix their names hereto as attesting witnesses.

The foregoing instrument was now here subscribed, declared and published by the above named testator,_____, as his last Will and Testament in the presence of us, who, in his presence and in the presence of each other and at his request, have hereto subscribed our names as witnesses this the_____ day of_____, A.D., 19____.



As part of improved waste treatment system, a pump was installed to add 20,000 gallons of water per minute from Black Duck Bay. This cools liquid waste and adds oxygen for the benefit of fish. Refinery man, right, checks valve in the system.

BUILT TO PURIFY

Baytown Refinery treats wastes before discharging them into public waters

FROM the old handy man who sits on the back steps and whittles little bird houses to the large refinery that makes fuel for the nation, some waste in manufacturing is inevitable. The handy man can easily burn his wood shavings and sawdust, but a plant like Humble's Baytown Refinery can't just pour its waste down a nearby drain.

In a single day, the wastes from the Baytown plant would fill a tank five stories high and big enough to cover a city block!

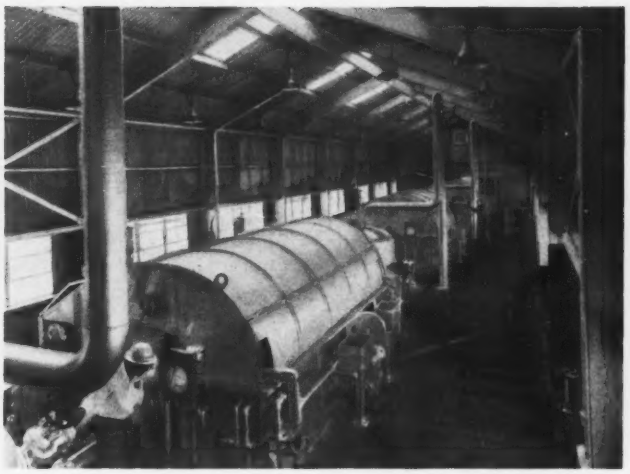
A separate waste disposal problem is created at each step in refining petroleum. Waste water from condensing and cooling equipment; salt water drained from crude oil storage; wash water carrying coke or spent catalysts, acids, caustics, dissolved chemicals; and even rain water loaded with silt plagues any waste disposal system. To treat these properly for discharge into public waters such as the Houston Ship Channel, each waste problem must be studied separately.

During World War II, Humble, along with the rest of American industry, expanded rapidly to take care of the hungry demands of war. Because of this rapid growth and lack of materials, facilities for handling industrial wastes were quickly outgrown. Old equipment was overtaxed and the small amount of new equipment installed often couldn't handle the job.

Through relentless research since the end of the war, long strides have been made toward developing new and more efficient ways of purifying wastes. Air pollution, as well as stream pollution, is being studied by men in all branches of industry; and Humble engineers and scientists are contributing greatly to progress in the research.

Since it has always been the earnest desire of Humble to keep public waters unpolluted, study of waste disposal problems at Baytown has been continuous. But a concentrated program was started soon after V-J Day to make up for the growth during the war years. In 1952, after years of planning and constructing, Humble will have enlarged or modernized equipment capable of treating thirty million gallons per day of plant refuse.

At Baytown, troublesome waste problems are first attacked in the test tubes of the research chemists. They pour, mix, filter, and test until some way—the easiest way, they hope—is found. The chemists then sit down with engineers to build, on paper, a new piece of equipment to handle the job on a large scale.



New, modern Effluent Filtration Unit at Baytown Refinery. In foreground are impounding basins where oil and organic acids are skimmed off before storing and processing. Above is the filter room, where undesirable chemicals and solids are removed.

From this beginning, finished plans are made and the unit is built and put into action. The whole waste treatment system at Baytown Refinery reflects just such detailed searching and planning.

Most process wastes go through several steps of treatment before they are released into the ship channel. After leaving a refining unit, these wastes are pushed through a recently enlarged gathering system to a big new treatment plant. In this plant, the pride and joy of the engineers, surface oil is skimmed off and the liquid is mixed with lime. This makes harmful chemicals settle to the bottom. After removing this sludge through big barrel-like filters, the remaining liquid is released to the sewer system.

A huge settling pit collects all the treated wastes from storm sewers as well as from the new treating plant for a last separation. Over the pit, like a robot, new automatic skimmers move along, scraping any remaining oil from the surface or silt from the bottom. The recovered oil is pumped back to the filtration plant for reprocessing.

In another new plant, all sanitary sewage is treated separately after being collected through a modernized system of sanitary sewer lines. The cleansed water from this plant joins the other wastes from the refinery after they leave the settling pit. But before this joint stream reaches the ship channel, 29 million gallons of fresh bay water is mixed in daily to increase the oxygen content of the processed waste waters. This protects marine life in the area.

All of these and many other improvements are now in operation at Baytown, and by the end of the next year even more advances will have been made.

But the problems don't end in 1952. Each new process to make a new and better petroleum product presents a new disposal problem. But through such continuing research and progress as shown by Humble men and women these challenges will be met.

Mindful of its obligations, Humble is moving forward, making sure that nothing harmful to fish or dangerous to public health is poured from Baytown Refinery into the waters of the Houston Ship Channel.

Another feature of Baytown's thorough-going waste disposal program is this completely covered concrete duct which carries wastes from refinery to ship channel.

GUNNING FOR MORE OIL

The industry's nimrods use perforating guns to open up flow channels for oil

IN THE past 20 years the earth's oil and gas reservoirs have become a huge underground shooting gallery.

Almost everywhere that men hunt for oil, they go equipped with a special weapon — the perforating gun — and spotting of the elusive quarry is followed by the rattle of a subterranean fusillade. You can't hear it, of course, for these shots are fired thousands of feet below the surface. Steel bullets or jets of tremendous energy zip through casing and cement to lay bare the pores of oil-bearing formations.

Gun perforating was first introduced in the 1930's. Since then, it has been such a rousing success in such a variety of applications that it has been dubbed one of the greatest things to hit the oil industry since the rotary rig. To it has been credited the recovery of millions of barrels of oil which otherwise would have remained inaccessible. As one enthusiast put it, the perforating gun is "the key that unlocks nature's storehouse."

Before the advent of gun-perforating, it was common practice to complete an oil well "barefoot"—to produce it from an open hole. Open hole completions are still used in some localities (especially West Texas) but in most oil fields, perforating—either by bullet or by shaped charges—has become standard operating procedure. Today, in more than 75 per cent of its wells, Humble sets casing through the pay zone and then perforates.

It was the gun, and not the perforating, that was new to the industry two decades back. Mechanical tools had long been used to punch holes in casing to open up oil and gas sands which had been by-passed. As the pay zone at the bottom of a well played out, the operator would start coming back up the hole to tap the oil in a productive upper section. But the mechanical perforators had several bugs: they often failed to jab through into the formation, they left tool-sticking burrs inside the casing, and their accuracy was questionable.

The gun-perforator, on the other hand, gave much better penetration. Its bullets plowed through one, two or even three strings of casing. The burrs were still a problem, but not so much as before. As for accuracy, one early inventor boasted that his gun could "be placed to the very inch in the horizon where the perforations were to be made."

The perforating gun bears little resemblance to any other weapon in the arsenal of mankind. Basically, it is a rugged steel bar, round in shape and about six feet long, which has a number of gunports spiraling down its side. You can get a general idea of what one looks like by visualizing a number of single-shot .45 caliber pistols set at regular intervals in a piece of pipe.

Small enough to fit inside the casing, the gun is lowered into the well and fired electrically. Its shots then go right-angling outward to puncture its target—the surrounding casing, cement and formation.

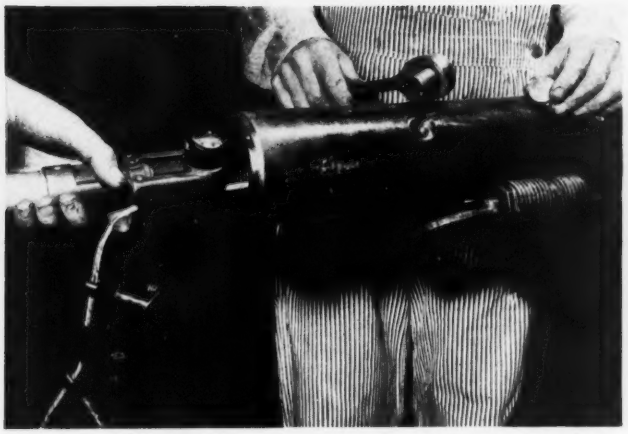
Shaped charges of jet-type guns fire with velocity 10 times that of bullets.

The effective range of these underground guns isn't great. It may be only a few inches or at the most a foot. But consider the formidable obstacles a shot must penetrate: a steel casing wall about three-eighths of an inch thick, a sheath of hard cement which may be more than an inch thick, and finally the formation itself. If to these variables are added additional strings of casing, the job of penetrating gets even harder.

The gun has been called one of the least efficient forms of the internal combustion engine. The gun's barrel is its cylinder, the bullet its piston, and the powder its fuel. A simple mechanism, all in all, but designing one that could be depended upon to work in the wet, narrow confines of a well bore, one that would not misfire when the chips were down, was no easy matter.

For one thing, there was the ancient problem of keeping your powder dry. This was solved by placing metal or rubber seals over the gunports to keep out liquid. Then there was the problem of high temperatures. In deep wells, the underground temperature may pass 212 degrees—the boiling point of water—so it was necessary to develop a powder which would not deteriorate or fire spontaneously under this terrific heat. Finally, the shooting apparatus, powder and all, had to fit in a gun barrel ranging from about 2½ inches to 9½ inches in length, depending on the carrier's diameter.

To men with a sound idea, though, problems are seldom insurmountable. In a trade journal article of 1930, one of the early perforating-gunsmiths told of the difficulties he had in moving his gun from the blueprint stage to a finished product. He approached several arms manufacturers, and all took a dim view of his idea. Finally, he took a chance, had one built on his



Jet-type gun takes on its load of shaped charges. Metal fluid seal held by man on right fits over gunport, keeps out liquids.

Elaborate panel inside truck is used to trigger perforating gun. A safety switch on the derrick floor prevents premature firing.

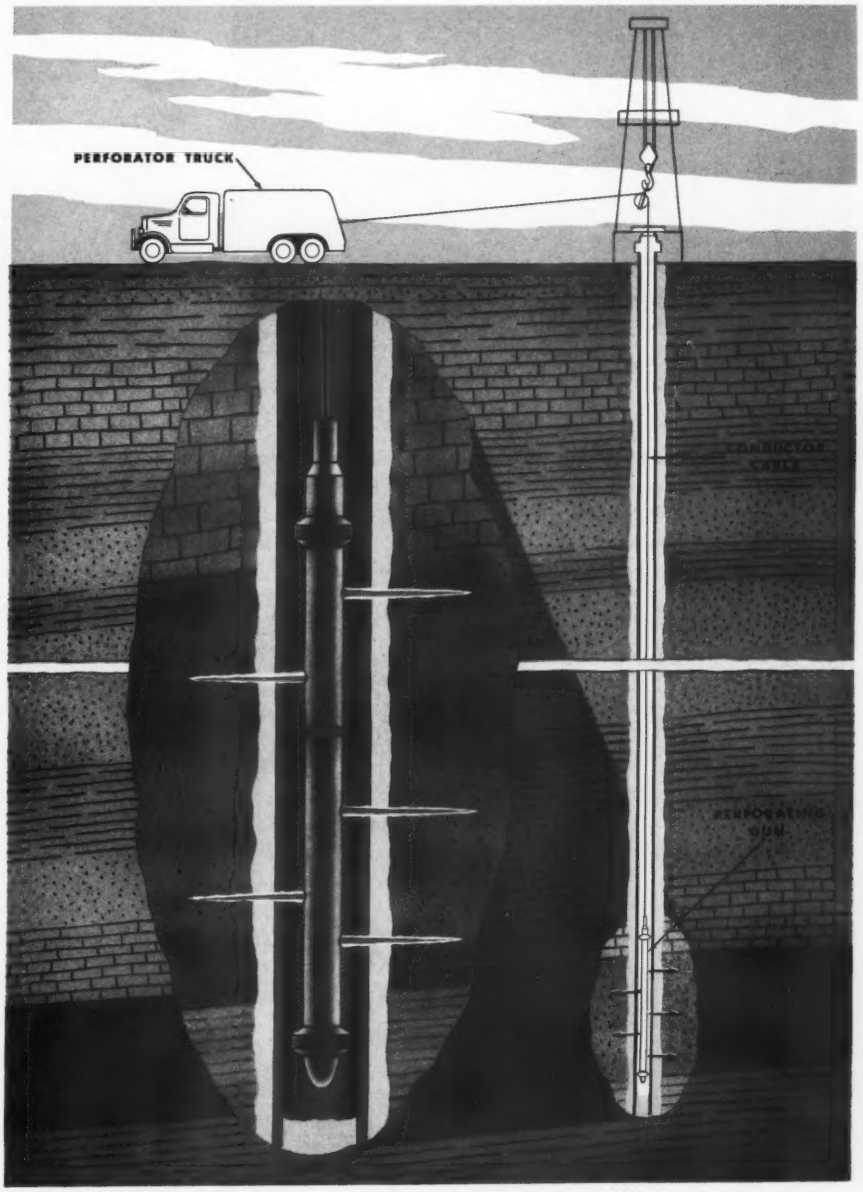
own hook. Sure enough, it worked. Today, of course, a dozen or more different guns—all of a family but differing in details—are on oil's firing line.

The earliest guns fired only bullets, and generally they were pretty effective. They stung many a new well into action, and then also gave a new lease on life to hundreds of old wells which might otherwise have been abandoned. A particularly lush target might be peppered with several hundred or more bullets. These guns were not, however, the ultimate in efficiency. It was not too unusual, Humble engineers recall, for a driller to bail bullets from his well after a perforating job. They had bounced off the casing.

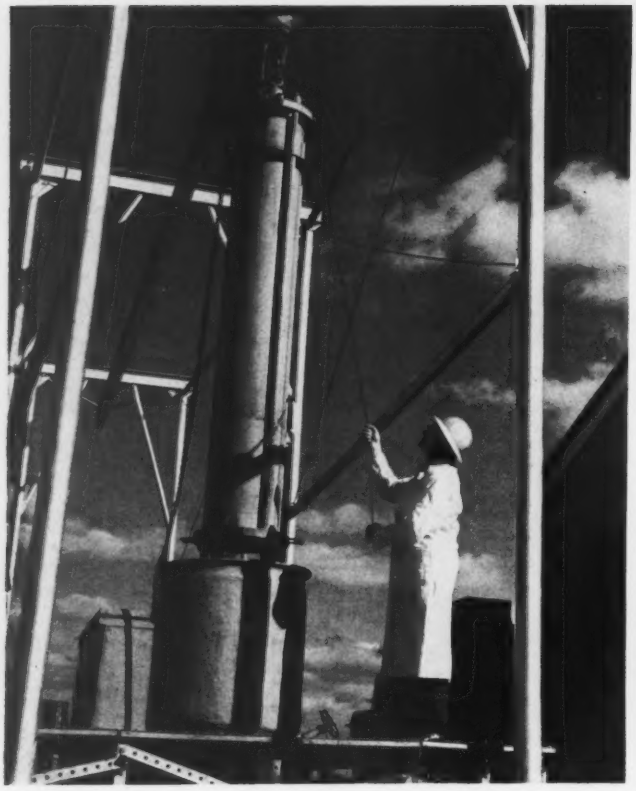
A competitive gun—one inspired by the bazooka of World War II fame—was put in service a few years ago. This type fired a shaped charge, and it gave considerably better penetration than the bullet guns available at that time.

Instead of using a solid projectile to deliver its punch, the new gun relied on a high explosive which was hollowed into a metal-lined cone at the business end. When fired, the charge focused its explosive force into a thin, pencil-like jet of fine metal particles. This jet generated a pressure in excess of 3½ million pounds per square inch and had a muzzle velocity of about 30,000 feet a second, about 10 times that of a rifle bullet. Its impact over short ranges was tremendous.

As a phenomenon of ballistics, the shaped charge had been around a long time. Back in the 1880's, Dr. Charles E. Munroe, a chemist working at the Naval Torpedo Station at Newport,



Perforating job is shown here in schematic diagrams. Gun is placed opposite target formation and fired electrically from truck. Inset shows more detail.



Pressure chamber holding steel and cement target is lowered into well as first step in testing single-shot perforating gun.

Engineers connect firing wire and water hoses. Latter provide heat and hydraulic pressure to simulate actual well conditions.

R. I., noticed that when he exploded blocks of guncotton against steel plates, any cavities in the cotton were reproduced in the plates. Experimenting further, he scooped out a crude counterpart of today's shaped charge and tried it out on top of a steel safe. When the smoke cleared away, there was a hole in the safe.

The shaped charge remained one of those interesting, but little used, scientific principles until World War II. It was then dusted off by several nations and put to work in tank-killing weapons like our own soldiers' bazooka. At war's end, the shaped charge was converted to industrial use, and for a time it threatened to overwhelm perforating guns which fired only bullets.

Competition, however, works both ways. When a rival weapon started stealing its thunder, the bullet gun stirred itself, took on a number of ballistic improvements, and eventually regained its place on the varsity. Today, jets still generally provide deeper penetration, although some of the recently developed bullet guns now appear to be competitive with jets.

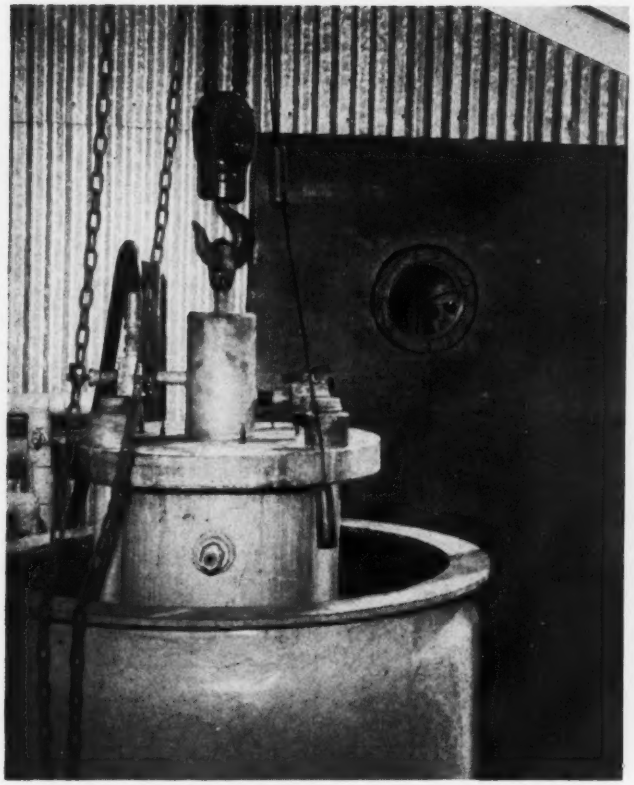
In specific terms, here is how this matter of competitive guns has redounded to the benefit of the American economy: For 15 years prior to the introduction of the shaped charge, there had been practically no increase in penetration of gun perforators. During the past three years, however, the effective depth of penetration has jumped from a meager one or two inches to a depth of six to eight inches for several casing perforators and to a whopping two feet for a super shaped charge generally used in perforating open holes.

Important? Well, the engineers say faulty penetration may have condemned many a well that was potentially productive. It's like a youngster reaching for the jam. If the shelf is an inch beyond his groping fingers, he is foiled (usually). Similarly, in the oil business one small inch can mean the difference between a dry hole and a producer. It can mean the difference between no oil and a million barrels, or in a wildcat well the stakes may be multiplied manyfold.

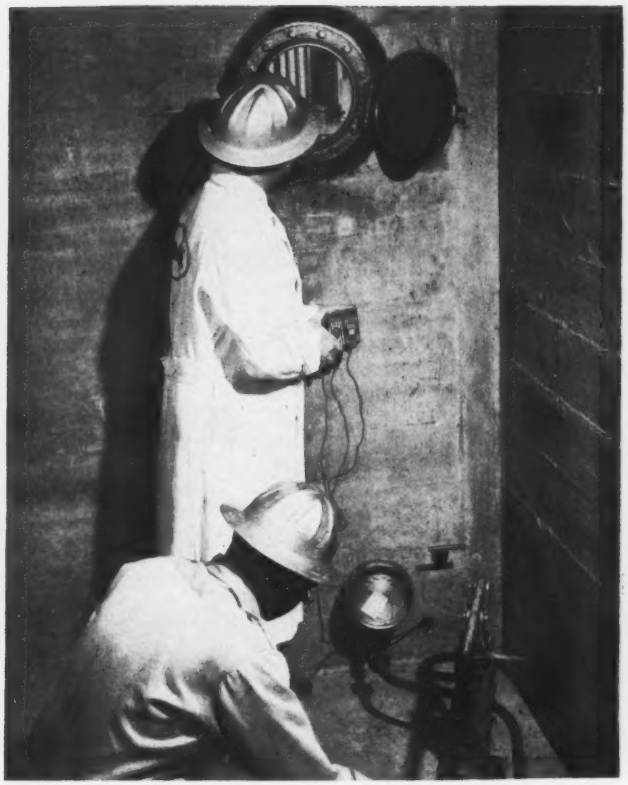
It is currently something of a standoff between the shaped charge and the bullet. Humble uses one type of gun about as much as it does the other, the choice hinging on the kind of perforating job needed for a particular well. A bullet, for instance, will fracture a cement sheath more than the jet of a shaped charge. This might be good in one well, bad in another.

In a modest laboratory on the outskirts of Houston, Humble is carrying on a continuous research program aimed at taking the guesswork out of gun-perforating. Here the Company has tested every known perforator in the United States against a standard sample. The shots are fired in a pressure chamber which simulates actual temperature and pressures of oil wells.

Such research has taken on added weight because of the many additional uses to which perforating is put these days. Its primary function is still one of providing close control over producing zones, but no longer is the technique's sole use that of opening up a flow channel for oil. Nowadays operators often perforate and then squeeze



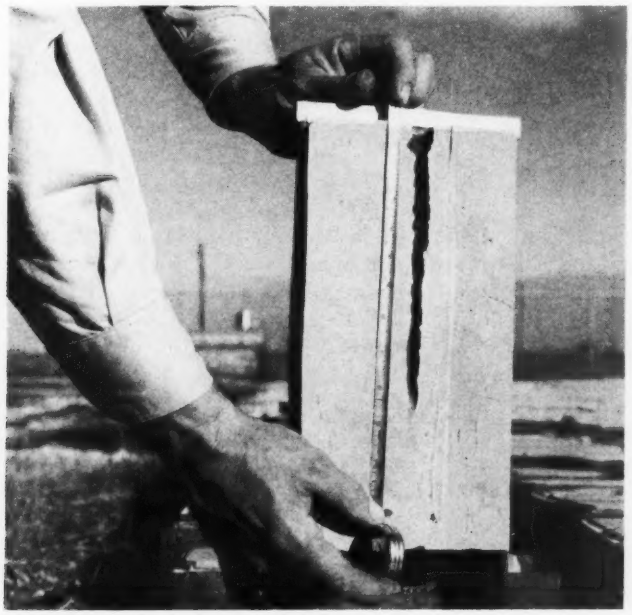
With gun all ready to fire, engineer retires to the concrete shelter, prepares to watch test through bullet-proof porthole.



Inside concrete shelter, one engineer holds electrical firing mechanism. Another checks on gauge showing hydraulic pressure.

cement through the holes in order to block off unwanted water or gas. Or they may perforate as a preliminary to acidizing or hydraulically fracturing an underground formation.

In this supersonic age, old ways of doing things are constantly being scrapped. It seems a safe bet, though, that perforating is here to stay, and that for many years to come the petroleum industry's nimrods will be actively afield—gunning for oil.



Standard target has been sawed in half and is being measured for depth of penetration. Test shot traveled nearly nine inches.

In orderly array, these perforated targets are being checked by engineers. Each target has steel plate over body of cement.

Wide spacing of wells shown in this aerial view of the Natchez oil field gives testimony of the conservation-mindedness of Mississippians and their state Oil and Gas Board. Orderly development has brought state to ninth place in production.

MISSISSIPPI MOVES UP

Oil leads industry to a full partnership with agriculture in Mississippi's economy as state becomes ninth ranking producer

MISSISSIPPI, for the past century a power among cotton-growing states of the South, is flexing new muscles these days—the muscles of industrial might.

Scores of industrial plants, machines humming and smokestacks busy, have sprung up over Mississippi during the past decade. Drilling rigs dot the fields and woodlands. Their clank of steel and hiss of steam mingle with the rasping whine of sawmills and the steady purr of farm tractors, breaking the traditional quiet of the cottonfields and bringing needed variety to what has been described as a single-crop economy—an economy based on cotton.

No student of history and economics would deny that Mississippi has been among the leaders in an industrial upsurge that is sweeping the South. And oil has played a big part in bringing the state to the forefront.

In 1939 the first commercial oil field for Mississippi was discovered near Tinsley in Yazoo County. Three years earlier the state legislature had introduced to the people of Mississippi the BAWI program, a plan to "Balance Agriculture with Industry."

These two totally unrelated events soon merged into a single movement of great import—like a transfusion that was to send new blood coursing through the state's economic and social veins.

The Tinsley oil discovery set in motion a widespread but orderly exploration campaign. In the short span of 12 years Mississippi came from the ranks of a "have not" oil state to that of a respectable ninth place in the nation with a daily production of more than 100,000 barrels.

The BAWI program had a dual purpose: to help improve and diversify agriculture; and to bring into the state industries that would employ local

labor and manufacture into marketable goods the products of Mississippi fields and farms and mines.

Since the beginning of the BAWI program 15 years ago, 106 industrial plants have been opened in Mississippi. Between 1938 and 1941 the program brought in 12 plants. After a three year lull, the program was revived in 1944, and since that time important plants have been added each year. Because 64 of the 106 enterprises have been the direct result of the program, many Mississippians believe that the industrial awakening brought about by the program has acted as a magnet to attract other industries.

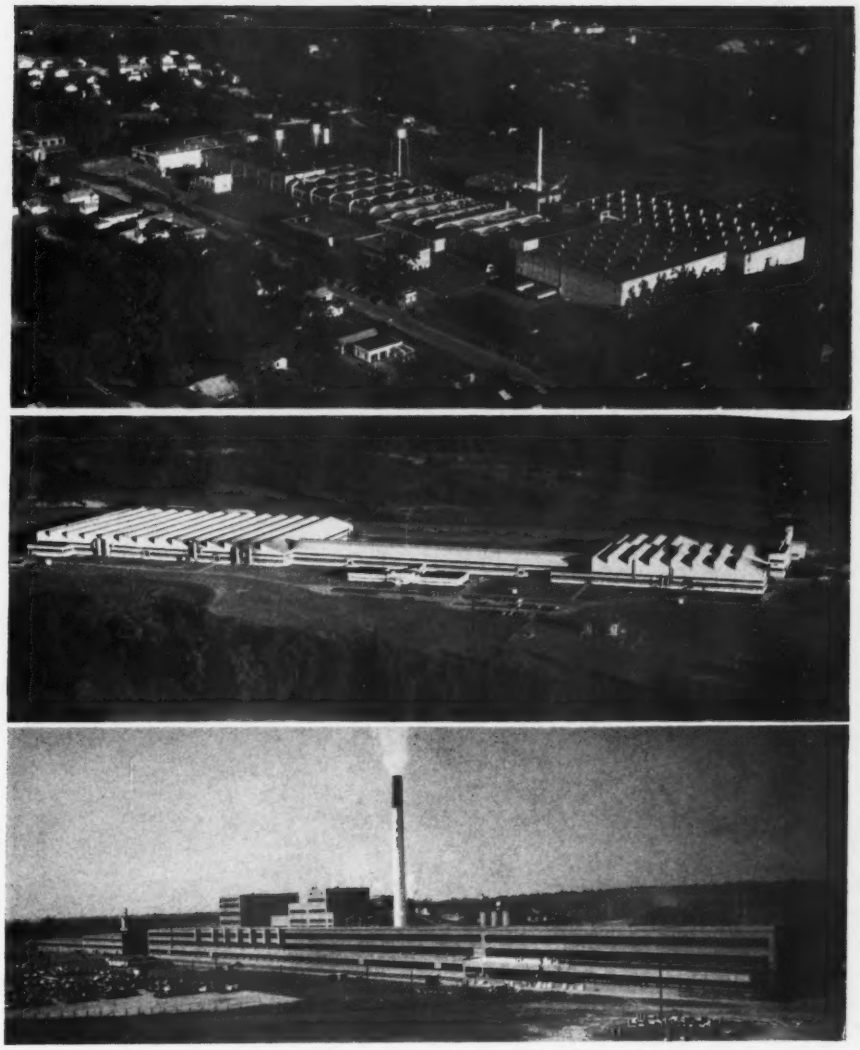
Locally or regionally produced raw materials figure prominently with all of these industries. They include lumber, woodworking and rayon plants, textile and garment plants, cottonseed oil mills, meat packing plants, and factories for the manufacture of glass, tung oil, chemicals, and automobile tires.

While this industrial program was gaining momentum, a parallel of progress has been witnessed in agriculture. Mechanization, crop rotation, cover cropping, pasture improvement, and soil conservation have improved the productivity of millions of acres. Though fewer people live on the land, the production per rural worker has increased. More cotton, grains, pecans, and tung nuts have been grown in the past decade than ever. Pasture improvement has made possible a sharp increase in beef and dairy cattle; and in the last few years there has been a pronounced expansion in chicken and egg production. Broiler production has increased 644 per cent in the last five years.

Not only in the old established crops have Mississippi farmers made progress; they have been quick to take on new crops that promise to yield a good return.

Tung nut orchards which were comparatively new to the Mississippi Gulf Coast a decade ago now cover an estimated 150,000 acres. Though many of the orchards are young and not yet bearing, annual production of nuts approaches 30,000 tons; market value is more than $1½ million.

Of considerable interest, also, has been the recent development of rice growing in the Delta country around Greenville. Here experimental work with rice on "buckshot" land (tricky for cotton growing) has been successful. There is promise that more than 25,000 acres will be planted to this crop in 1952.



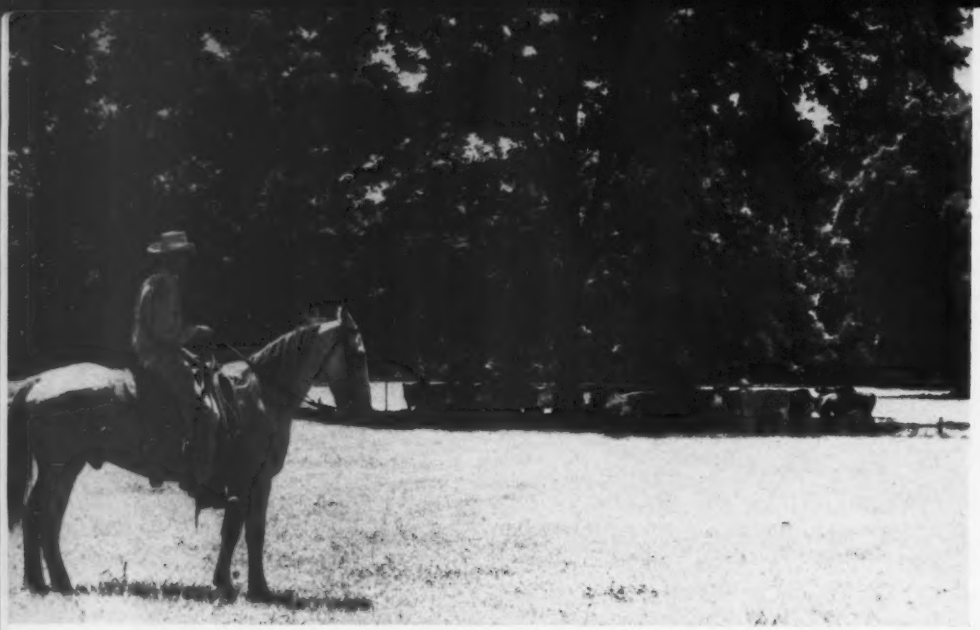
The three large industrial plants shown here have been built in Natchez during the past 10 years. Above, Armstrong Rubber Company's tire plant; center, the Johns-Manville factory; and below, the new paper plant of International Paper Company. The three use mostly raw materials produced in Mississippi, employ more than 2,500.

Into this agricultural and industrial pattern of progress for the well-being of Mississippians, where does the oil industry fit? In what way does the development of the state's petroleum resources play a part in this upsurge?

Mississippi is a comparatively newcomer to the family of oil producing states. But its government leaders carefully studied the laws and practices of other producing states and have developed "model" conservation laws and as near an ideal administration of these laws as exist anywhere.

These facts add up to what may be called a good climate for the oil industry. Though wells must be drilled deeper in Mississippi than in any other state, development of petroleum resources has been rapid and orderly. The average depth of wells for the nation is 3,864 feet; for Texas, 4,500 feet; for Louisiana, 6,500 feet; and for Mississippi, 7,000.

Despite the obvious greater cost of drilling in the state, 75 independent or small operators and 18 major or large independent companies have since 1939 drilled more than 500 wildcat wells in 77 of the state's 82 counties. Of these test wells 486 were "dusters." At mid-year, however, Mississippi had 40 active oil fields with 1,705 produc-



Improved herds and better pastures, resulting from continuous experimental work, have given considerable impetus to beef and dairy industries in the last decade.

Delta farmer and county agent look over an experimental field of rice in the Delta country where this crop is being grown successfully; below, highway development and oil development have progressed hand in hand for the well being of Mississippians.

ing wells and 23 gas fields with 975 active gas wells.

The state's daily production of oil currently is about 101,000 barrels, its daily production of gas is about 440 million cubic feet.

Royalty payments, lease bonuses, and rentals to Mississippi land owners amounted to some $14 million in 1950.

Taxes paid by the industry in the state were in excess of $10 million.

Around 5,000 citizens are employed directly in the petroleum industry, with an annual payroll above $15 million. Hundreds more earn their living in jobs closely associated with the petroleum industry.

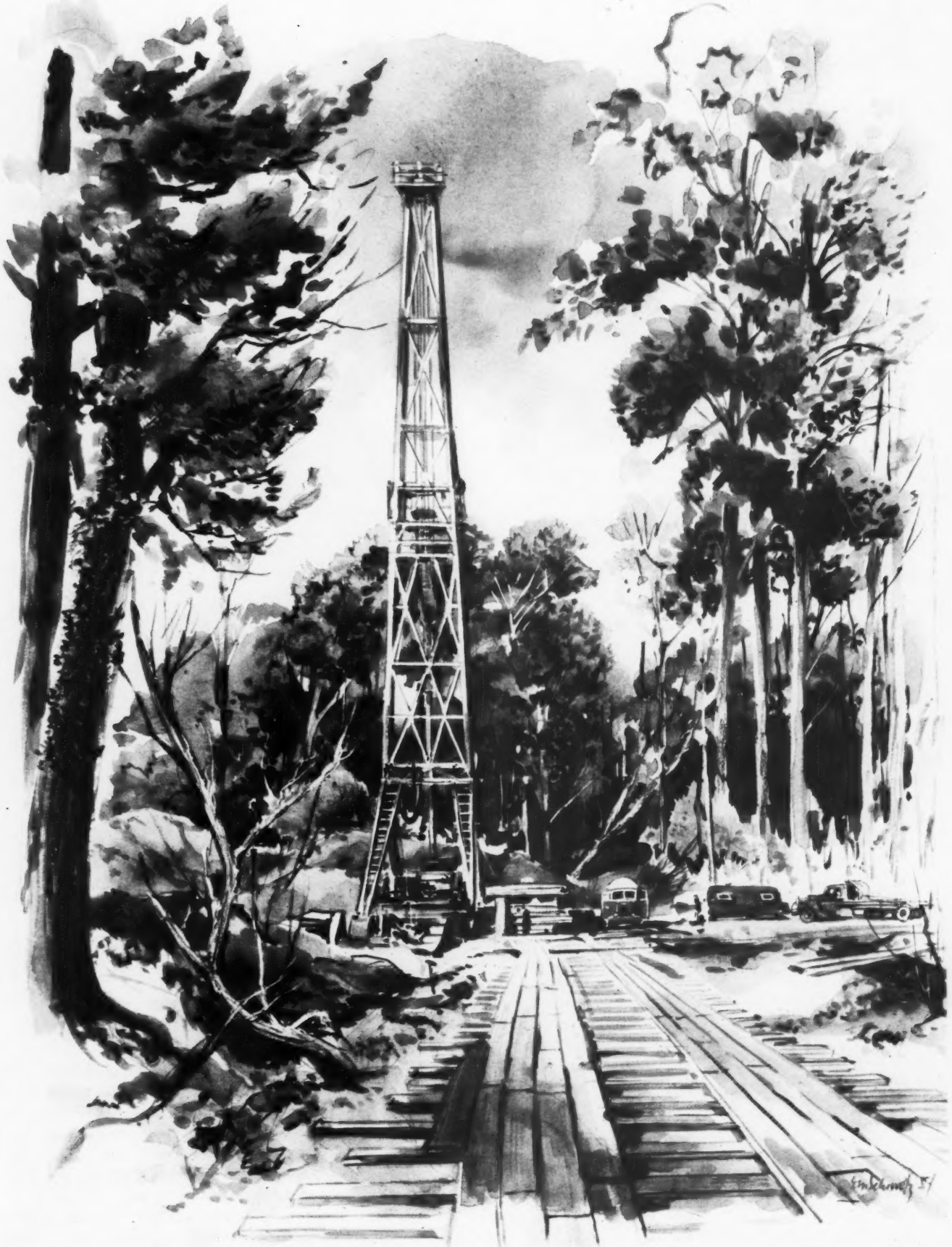
These are the figures which point to the industry's part in adding to the well being of Mississippi. And prospects are bright for a continuation of this contribution, for, due to its fine conservation laws and their excellent administration, Mississippi's oil and gas resources are calculated to last for many years.

In the overall pattern of discovery and development of reserves, Humble is proud to have played an important role. Since beginning operations in the Magnolia State in 1942 Humble has drilled 85 wildcat wells. Of this number but seven have been successful, crediting Humble with the discovery wells in these oil and gas fields—Hub, Sandy Hook, Sibley, Natchez, North Natchez, Sand Hill, and Fayette.

Development of these and other properties in Mississippi has come as a result of an expenditure by Humble of more than $90 million in exploration, drilling, and producing operations.

Like other operators, Humble is continuing its work in Mississippi. Persistent wildcatting by all operators has discovered 12 new fields—10 oil and two gas-condensate—in the first 10 months of this year and has added materially to reserves.

It is apparent, then, that petroleum's part in driving and lubricating the wheels of Mississippi's rolling agricultural-industrial partnership is destined to be a lasting one. The friendly, cooperative attitude which the state and its citizens have shown to the petroleum industry and to other industries has been a major factor in recent progress. If it continues there is every reason to believe that Mississippi will continue to move up.



Wildcat in Mississippi

E. M. Schiwetz

Mississippi

TO PORTRAY how the oil industry fits into the Mississippi scene, artist E. M. Schiwetz traveled widely over the oil producing areas of the state in the early fall. In the cover painting and in those here and on the foregoing page he has recorded his impressions.

The season was ideal for an artist like Schiwetz who is fond of rich colors. Wood-

Contrasting the old and the new—a favorite pastime with artists—brought into being this forceful water color. With an afternoon shower for a backdrop, the farmer's cabin stands in quiet simplicity among producing wells in Yellow Creek field.

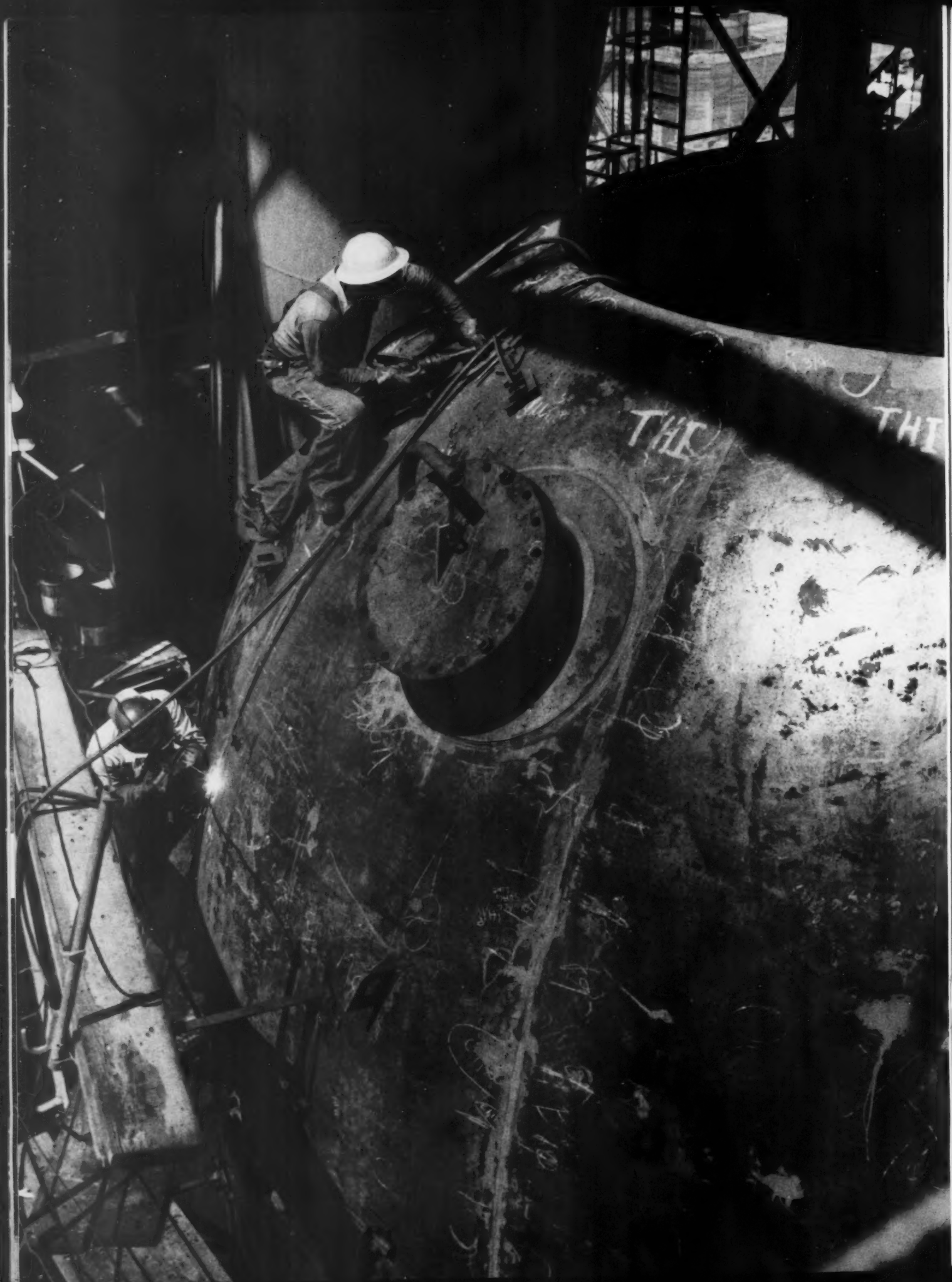
Aflame with brilliant color was this oil producing scene in the woods near Eucutta. The power mower for trimming grounds around the tank battery fascinated the artist. "I was tempted to feature it," Schiwetz said, "but resisted because the blaze of autumnal color made the machine an almost incongruous part of the scene."

Attractively landscaped employee campsite in a pine grove near Brookhaven caught the artist's fancy. A cotton field across the road served as an ideal vantage point from which to paint the Mallalieu field community in its true quiet beauty.

pi Oil in Art

land browns and ambers of early fall foliage and strong earth colors offered contrast with the deep greens of forest pines and magnolias.

With his love for architectural gems, Schiwetz could not complete his report on Mississippi without adding one of his inimitable pencil sketches (left) of a proud old Natchez mansion.



From ground floor to the top of Cat No. 2 is a long haul for the massive rings of steel that make up the reactor vessel. At left, three rings await the skyward journey. Center, one huge ring swings slowly up the side and (right), enters unit.

BIG REACTOR JOB

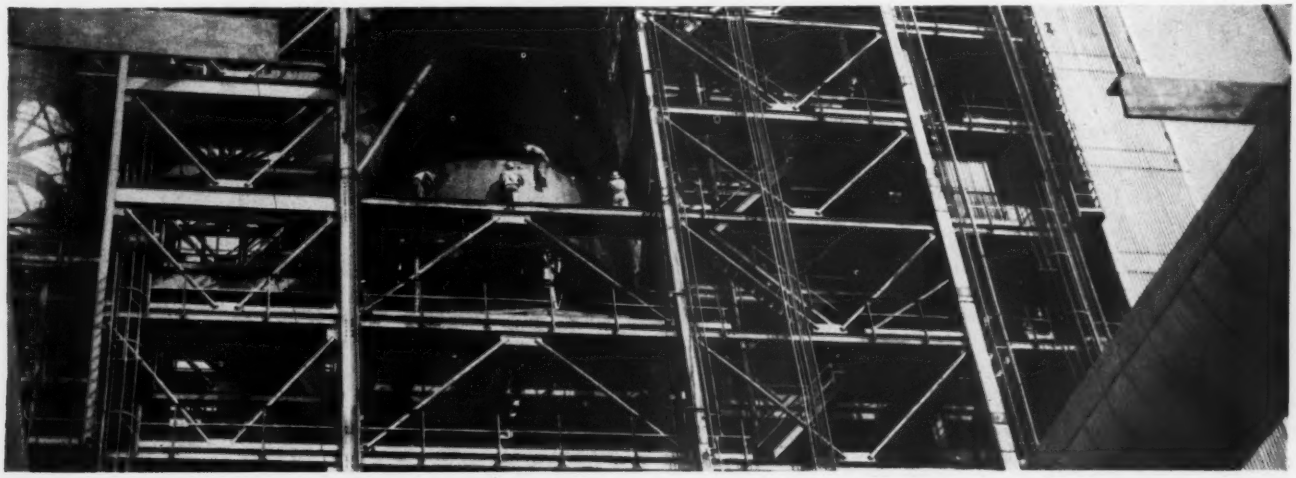
ON FEBRUARY 8, 1951, someone at Baytown Refinery peered casually skyward and was startled to see oil vapors leaking from the reactor of Fluid Catalyst Cracking Unit No. 2. The reactor is the huge steel vessel where oil and catalyst swirl together under high temperature until oil molecules "crack" or change into high quality gasoline. After 53,000 hours of operation over a 7-year period, the reactor itself had cracked under the strain.

It took a million dollars in labor and materials, plus the loss of eight months operation, to put No. 2 Cat back on its feet. When the unit was shut down and the oil pumped out, tests proved that the reactor's steel shell was in a bad way. One 8-foot-long crack was found in its side, and the shell was cracked or seemed in danger of cracking at other places. Metallurgists found that the steel in the shell had undergone drastic changes; minute particles of graphite (a form of carbon used in lead pencils) had formed in the steel.

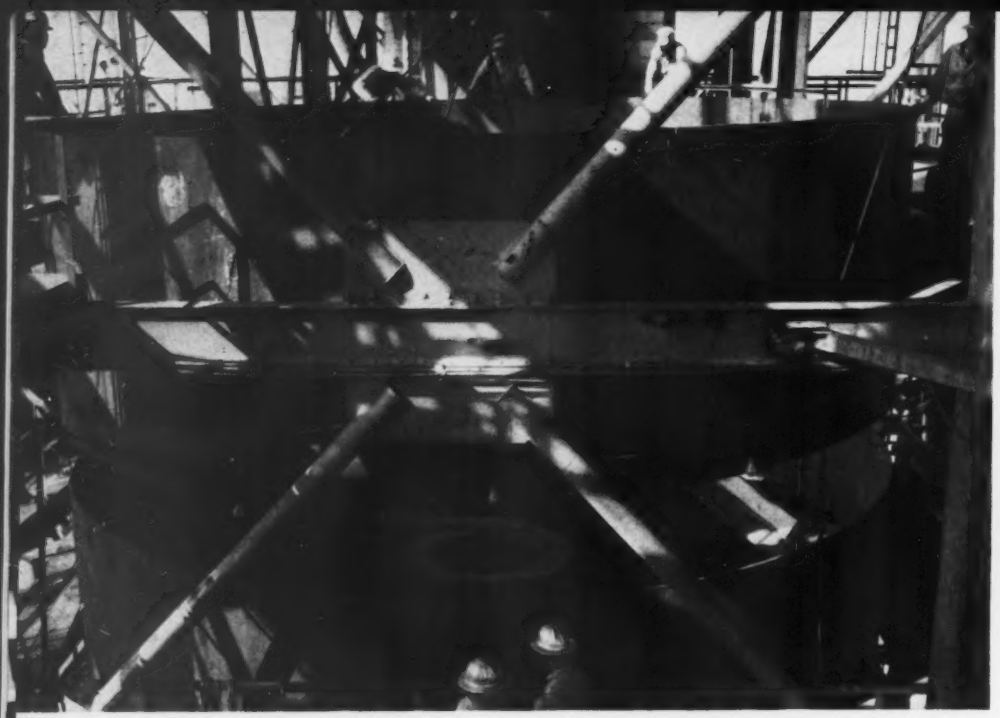
Could the old reactor be repaired and kept in service? Every day the giant unit was idle meant a loss in refining capacity and a great financial loss to the Company.

Management considered the problem. The reactor could be patched up by welding strips of metal over the cracks, like a shoe is half-soled. And perhaps the method of operating the unit could be changed to take care of

At last drawn snugly into place inside the tall unit, bottom ring of reactor awaits the welders. Vessel will gradually take shape as ring after ring is hauled up, secured in place, and welded to the one before it, then insulated inside against heat.



Size of the reactor job is emphasized at left. Reactor is vessel in which oil and catalyst swirl together until oil cracks into high quality gasoline.



Gracefully framed at the X formed by two steel supports, a ring of reactor steel poises gingerly for a moment above the precise point where it will join ring below.

the ailing reactor. But considering the time it would take to make temporary repairs, and for reasons of safety and efficient operation, it seemed best to tear out the old reactor and start all over again with a new one.

That decision, once made, brought on fresh problems. Should the new reactor go back into the same place the old one had occupied? Or would it be better to place it elsewhere in the unit? Should it be the same size and design as the old vessel? Or could engineers take advantage of this chance to alter size and design, and make improvements and process refinements?

Each question was treated with the consideration it deserved. It was agreed, at last, to place the new reactor in the same position occupied by the old one. But this time the vessel would be larger, would contain more *cyclone separators*, where catalyst is separated from out-going oil vapors, and would feature improvements designed to lengthen its life.

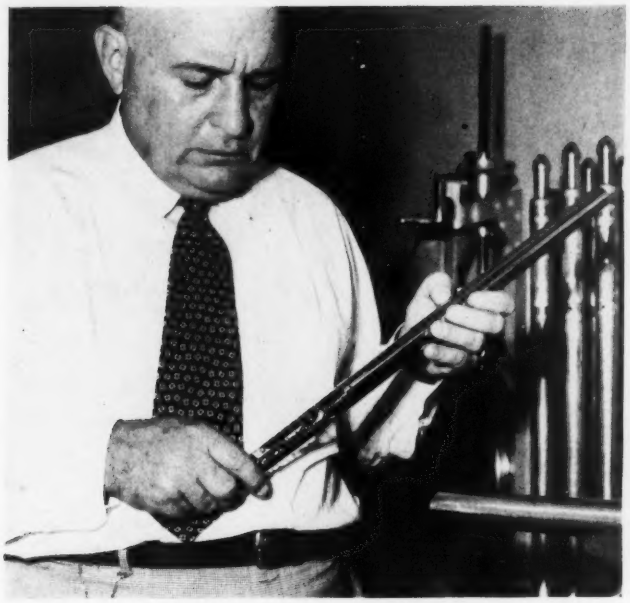
The specifications called for a reactor shell of carbon steel—this time insulated on the *inside*, instead of on the outside, as before. By switching insulation from outside to inside, the shell could be kept much cooler. The old reactor was subjected inside to the 950-degree-Fahrenheit mixture of oil and catalyst. Inside insulation would keep the temperature of the new reactor down to about 300 to 400 degrees Fahrenheit. It was the prolonged service at high temperatures that had caused the old reactor's downfall, and reducing temperature by 500 to 600 degrees should do much to extend the life span of the new vessel. Lower temperatures also made it possible to use a thinner shell, which saved considerable steel—an important consideration in these days of steel shortages.

Some 350 tons of steel for reactor and major lines were rolled for the job during May. Meanwhile, the old vessel was dismantled and design work was going forward on the new one. Steel was fabricated in sections and shipped to Baytown.

During the first week in July the new reactor began to take shape, ring by ring. Two 10-hour shifts worked at the tasks of hauling steel up the side of the tall unit, welding it into place, X-raying the welds for flaws, and insulating the shell against heat.

At last, during the waning days of September, the job was finished. By the middle of October, Cat No. 2 roared back into life, a living monument to at least two traditions of the refining business: You never know what will go wrong next at an oil refinery, but you can be certain that whatever does go wrong will cost you money.

X-raying welds for flaws is important job inside reactor as vessel is built. At right, men huddle anxiously as riggers swing the vapor line into place for welding. Line carries hot oil vapors, free of catalyst, out of the top of the reactor.



Scientist checks over part of the inner workings of the self-contained oil well thermometer developed and built by Humble.

Business end inside the thermometer is this stylus, like point of fountain pen, which scratches temperature on a metal sheet.

TAKING AN OIL WELL'S TEMPERATURE

Thermometer developed and built by Humble checks well temperatures, helps tell about what's going on below

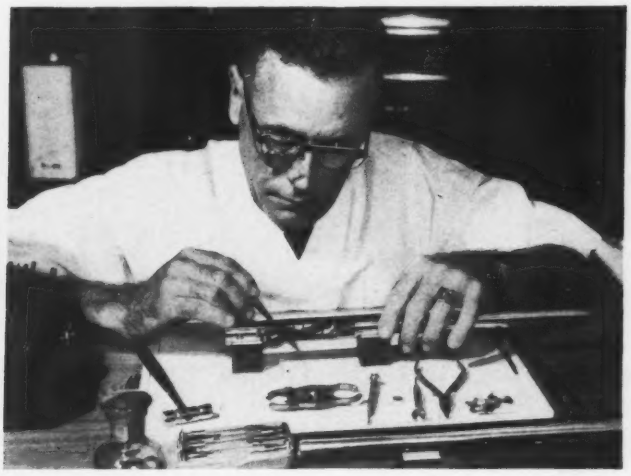
ANYONE who has tried to keep a thermometer three minutes under the tongue of a balky five-year-old knows something about the problems of taking temperatures. A petroleum scientist would rather play nurse to an oil well, though he has to go deeper, stay there longer, and has no "normal" 98.6 degrees Fahrenheit to guide him.

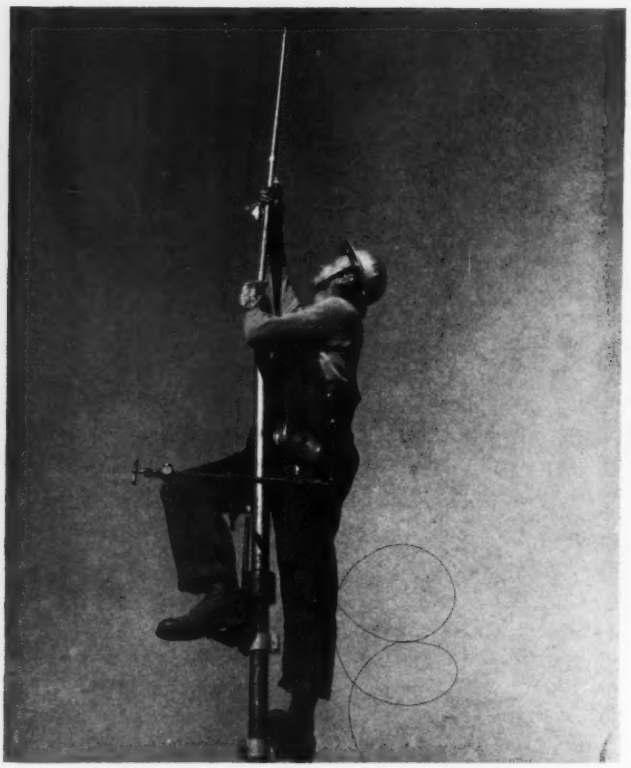
Just how hot does the bottom of an oil well get? A great deal of misinformation has served only to confuse the layman. Men who know better are quick to wave away wild stories of underground heat that melts drill pipe and turns drilling bits into white-hot blobs. There may be such infernos deep within the earth, they will tell you, but no drilling bit has yet probed them in the search for oil.

It isn't exactly cool down there, either. Even by normal standards at the surface, the bottoms of some oil wells can get uncomfortably hot. Many wells at the bottom are considerably above the 212-degrees Fahrenheit that sets water boiling. Some of Humble's producing wells reach a maximum of about 260 degrees, though some wells in the U. S. go to 300-400 degrees.

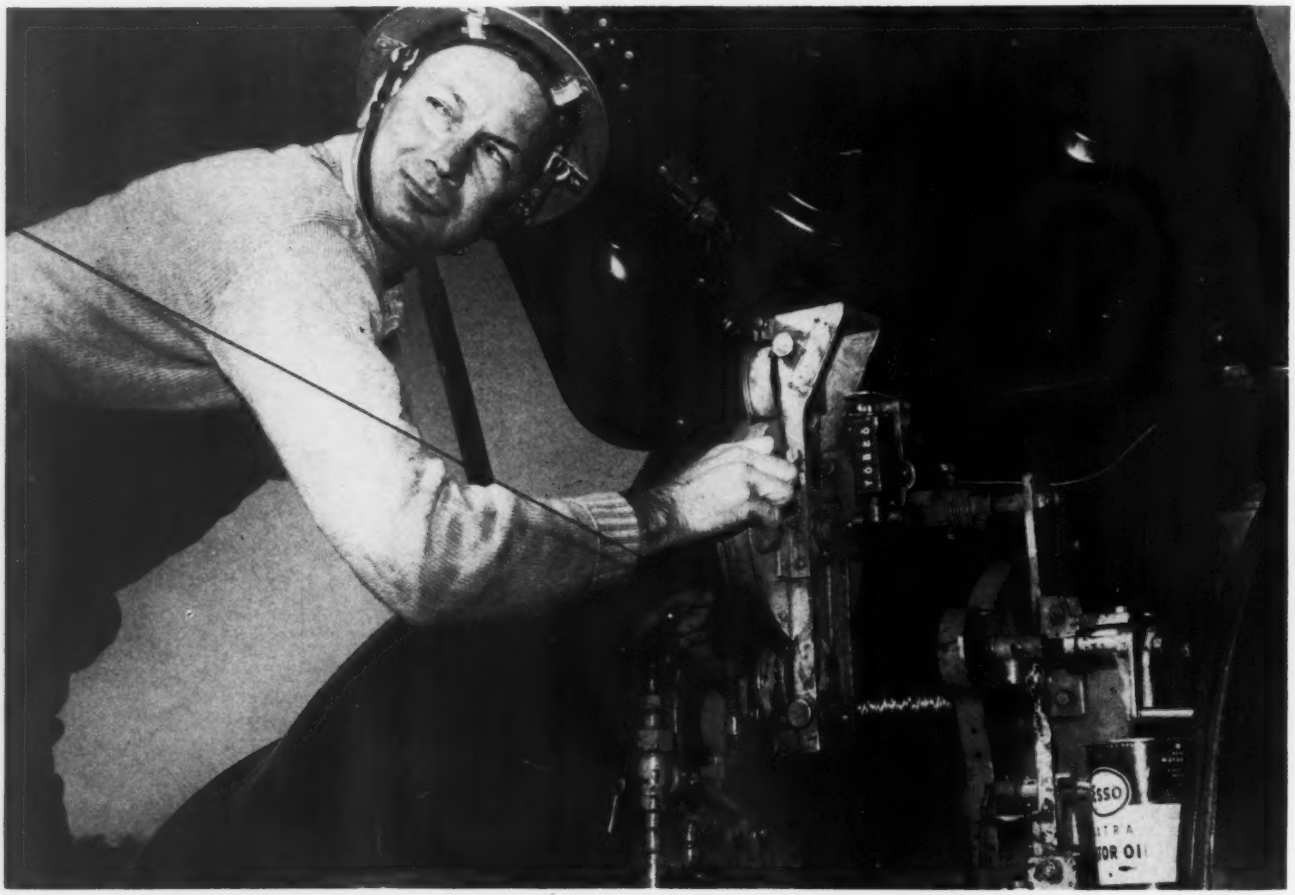
Precision parts of the thermometer, machined to small fractions of inches, are being assembled here by Humble craftsman.

Watchmaker checks through his glass tiny springs and flywheels of the clock that turns drum containing the temperature chart.





Inserting temperature chart, a thin strip of metal, before survey is made of a field well. At right, placing thermometer in the well. Below, research man making the survey lowers instrument far into well. Counter tells him how far down he has gone.



To men in the oil industry, an oil well's temperature is a thing to be watched as closely as a doctor watches a child's fever. But an oil well need not necessarily be sick before an engineer reaches for his thermometer. One big use of the instrument is to locate the top of a cement plug after casing has been cemented.

As cement sets, whether above or below ground, it gives off heat. Scientists honor this phenomenon with a six-bit term, *exothermic reaction*. As a thermometer is lowered slowly into the bore of a well soon after cementing a sudden departure or jump on the chart record shows precisely at what depth the instrument was influenced by heat generated by the setting cement. This defines the top of the plug, and tells whether the cement has reached the proper point up and outside the casing.

Another use of the thermometer in oil field work is to help locate that demon of production headaches, a casing leak.

When casing splits, or holes are eaten through it, valuable oil or gas rushes into the surrounding formation. An oil well thermometer in these cases points an accusing finger at the spot of the leak, for usually there is an abrupt change in temperature at the fleeting oil's escape hatch. Once the leak is located the well is killed temporarily and the casing repaired, if possible.

Thermometers go to bat for scientists and petroleum engineers in still another important way. Reservoir engineers, for example, need to know something of the makeup and characteristics of the oil "in place," in the reservoir. Heat, as much as any other one thing, affects the composition and characteristics of oil—changing them as the amount of heat changes. If they know the temperature of the oil, scientists can tell more about what *kind* of oil is down there, how it flows through the formation rock, how much of it can be produced economically at certain flow-rates, and other vital information.

The thermometer Humble uses bears little resemblance to the slim glass tube in the doctor's bag. It looks more like the business end of a javelin or spear —a long, stainless steel tube with a pointed knob on the end. That knob, by the way, was not so designed by accident. It is there for clamps to grab onto should the instrument break loose from its wire line inside the hole and have to be fished out!

• Humble pioneered in the development of the self-contained oil well thermometer, and built its first one in 1937. Research has since improved the first instrument, but today's model remains essentially the same in operating principle. It consists of two major parts—a measuring chamber and a recording chamber.

Part of the measuring chamber is filled with mercury, just like the doctor's thermometer. Placed near heat, the mercury expands and extends a piston against the tension of a spring. Then a small stylus, much like the point of a fountain pen, at the end of the piston scratches lines on a thin sheet of metal chart carried in a clock-driven drum in the recording chamber. Lines and curves scratched on the chart by the stylus are translated into degrees of temperature.

Humble not only invented the thermometer described here; it makes the instruments it uses. A corps of machinists, a watchmaker, and other skilled craftsmen collaborate with technical men to do the job. Some of the work of making and using the instrument is shown on these pages.

Familiar-type thermometers, packed inside tube, check accuracy of instrument.

Up from the depths, and removed from the thermometer case, this thin metal chart is the same as a written record of the well's temperature at various depths. Straight line at right is the "base line." All deviations from it are translated into degrees of heat.

TEXAS STAGECOACH INNS

OUR word *travel* comes from the Old French *travaillier*, meaning "to toil, suffer, be in torment." Travelers in early Texas, setting their teeth against the bone-bruising bumps of roads that were merely trails, agreed grimly that the word was well chosen.

Texans traveled more for profit than for pleasure in those days. And when they had to go somewhere, they took the nearest approach to travel comfort—the stagecoach. This offered a measure, however small, of speed and comfort. Besides, the stagecoach was the best available insurance that a traveler might reach his destination unmolested. A lone horseman in the days of the Republic was easy prey for desperadoes and scalping parties.

By present standards, fare was high and travel was slow on the "Old Concord" coaches that plied Texas routes. Coaches were pulled by teams of four to six horses or mules, depending on road and weather conditions, and the average speed was no more than eight or ten miles a day. Ten cents a mile was the usual rate in dry weather, but during rains first class passengers paid a "flood rate" of 15 to 20 cents a mile. A slight privilege went with the advanced rate. Second class passengers had to help pry the coach out of the mud when it got stuck. First class passengers were allowed to get out and walk.

Western movies invariably show stagecoaches toppling over cliffs, being riddled with Apache arrows, or bouncing along at breakneck speed to escape an outlaw band with robbery on its mind. The plain truth is, more discomforts were caused by bad roads than by bad men. To a tired and shaken traveler, rainbow's end was one of the stagecoach inns that grew up along major routes. Here, at last, would be good food, clean sheets, a bath, and a bed to relax one's cramped muscles.

Texas stagecoach inns offered gourmets little of the elaborate show of food its English counterparts were famous for. There were few roast suckling pigs, resplendent with apples in their mouths; few plum puddings glowing in the blue light of brandy flames. Texas palates were less patrician; but what tavern menus lacked in show, they made up in substance. Wild game was plentiful, and roasts were more often venison than beef. When fowl was called for, it was easier to shoot turkeys than keep chickens. And there was always plenty of those old Texas standbys—greens gloriously flavored with savory "side meat," crisply fried bacon, and golden corn pone.

Most of the Texas stagecoach inns have crumbled into ruin during the past century or so, but some still remain; a few in excellent repair. E. M. Schiwetz has sketched for this issue two of the better-known inns; one at Anderson, and one at Chapel Hill.

The Stagecoach Inn at Chapel Hill was built in the early 1840's by Jacob Haller, who came to Texas from Alabama. It was located on a Houston-to-Austin route followed by the first stagecoach line organized in Texas by Smith & Jones in 1841. A favorite tavern of many Texas notables, the inn boasted of a water pitcher and washbasin in every room, a real luxury in those days.

Haller built his place of cedar sawed at Jacksonville Mill on New Years Creek, one of the first sawmills in the Republic of Texas. After Haller's death, his wife ran the inn until it became the property of a Judge Thomas, who renamed it The Thomas Inn.

This historic place at Chapel Hill follows Greek Revival lines of architecture, and continues to maintain an air of faded magnificence. Its delicate Grecian frieze, or ornamented band circling the house at the roof line, still captures the eyes of visitors.

The Fanthorp Inn, at Anderson, is one of the most famous and certainly one of the most beautiful stagecoach inns in Texas. It stands today, in excellent condition, a private residence for Fanthorp's descendants.

Henry Fanthorp, an Englishman, moved to Texas in 1833 and bought 1107 acres of land for 25 cents an acre. He met and married Rachel Kennard, daughter of a neighboring plantation owner, and built the beautiful 2-story structure in 1834.

The Fanthorps were practically forced into the innkeeping business. It developed that their home lay almost precisely at the junction of two major stagecoach routes; one from Houston to Old Springfield, the other from Nacogdoches to Austin. Settlement of the State had only just begun, and travel was heavy along those routes. Since the Fanthorp place was the only house large enough to handle the traffic, there was little they could do but set up shop. Coaches from the two lines crisscrossing at Anderson came that way three times a week, and business was brisk.

Presidents, governors, generals, statesmen, and many whose names never made a front page rubbed shoulders at the Fanthorp Inn and praised its hospitality. Sam Houston was a frequent visitor. General Zachary Taylor, destined to become a hero of the Mexican War and later President of the United States, stopped there with a detachment of Federal troops on the way to the Mexican border in 1846.

During the same period came three other young Army officers assigned to duty in Mexico. They were friends, brothers-in-arms, at the time. But Fate was later to scramble their destinies and set them at sword's point against each other. Their names, in that happier time when they shared food and lodging at the Fanthorp Inn, were Robert E. Lee, Ulysses S. Grant, and Jefferson Davis.

In 1835, when the provisional government of Texas established a mail route from San Felipe to Nacogdoches, Fanthorp added the job of postmaster to his other duties. Later, he bought a stock of merchandise from New Orleans and opened a store.

In 1839, Fanthorp bought other acreage near his plantation and laid out a town which he called Alta Mira (high view), from its hilltop location. The name didn't stick; everyone knew the village as Fanthorp.

The present name of Anderson was not established for the town until 1845. In that year, Kenneth L. Anderson, vice president of the Republic of Texas, died at Fanthorp Inn and was buried in the family cemetery across from the Inn. In honor of his memory, Henry Fanthorp had the name of the town changed to Anderson, and Anderson it has remained.

NELSON M. DULLER, JR.
Physics
The Rice Institute

ISAAC DVORETZKY
Chemistry
The Rice Institute

NORMAN E. TRUITT, JR.
Chemistry Research Project
The Rice Institute

LONNIE W. VERNON
Chemistry Research Project
The Rice Institute

HUMBLE FELLOWSHIPS

Company program fosters graduate study in fields of science and engineering

A MAJORITY of the engineers and scientists that Humble employs comes from college graduates holding degrees at the Bachelor of Science level.

However, because of specialization and complicated nature of many processes and methods used in all phases of the Company's operations, Humble employs many engineers and scientists from among men holding Master's and Doctor's degrees. During a year's period ending in June, 1951, their number was 39 per cent of engineers and scientists employed.

Humble has set up a program of fellowships to help advance higher levels of learning in the fields of science and engineering. More specifically, the program has been designed to aid outstanding graduate students and help the graduate schools of science and engineering at several colleges and universities from which many of the Company's technical men were graduated.

Humble's Board of Directors voted the program of fellowships in February, 1947, to be awarded at six colleges and universities — three schools in Texas and three out of state.

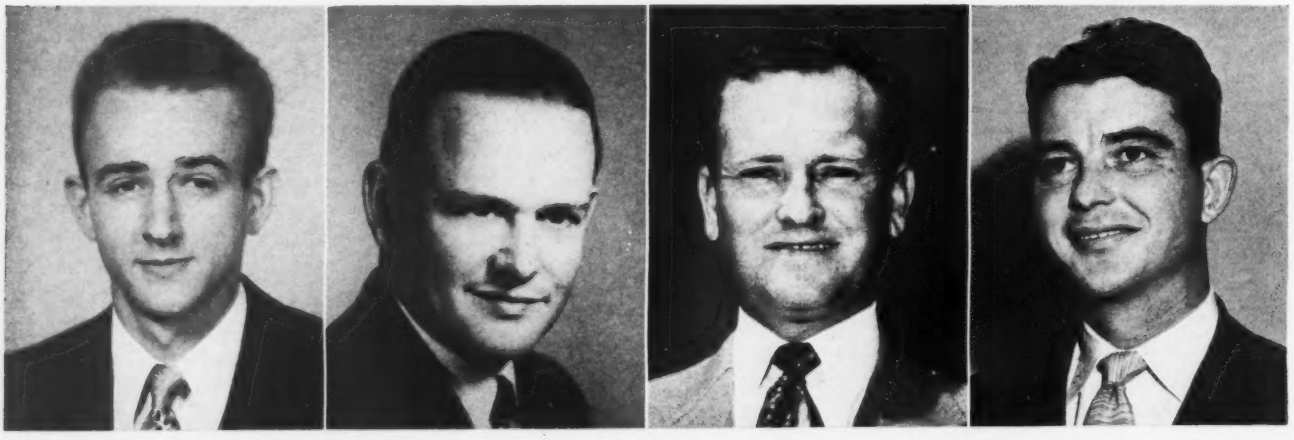
As a result of the program during the last five years, the Company has offered 60 fellowships in civil, mechanical, chemical, and petroleum engineering; physics; geology; and chemistry. Of these 60 fellowships offered, 58 have been awarded by the participat-

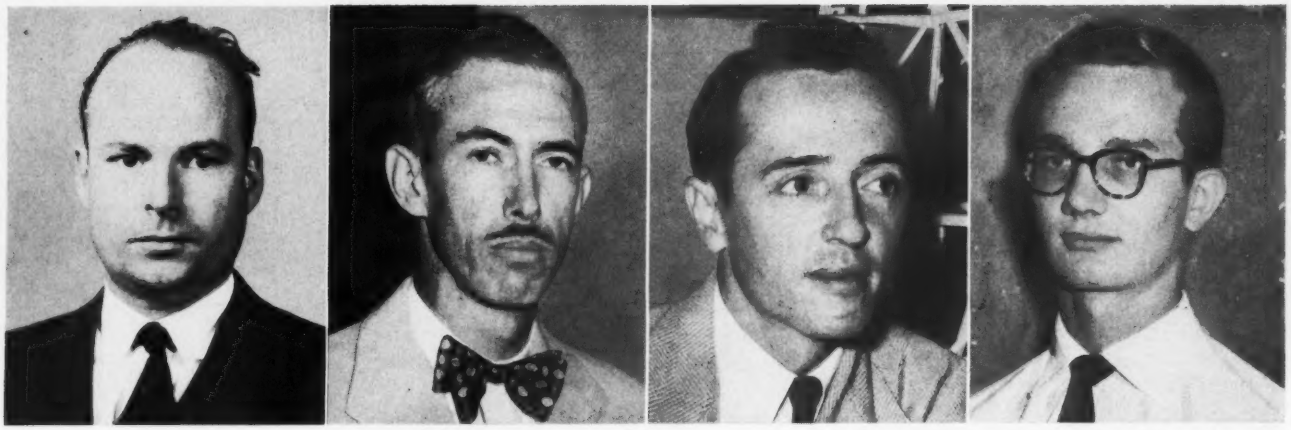
EARL G. WATKINS
Petroleum Engineering
University of Oklahoma

JACK G. BLYTHE
Geology
University of Oklahoma

CURTIS C. HARLIN, JR.
Civil Engineering
A. & M. College of Texas

CHARLES P. HOWARD
Mechanical Enginering
A. & M. College of Texas





T. H. Goodgame
Chemical Engineering
Mass. Inst. of Tech.

Joseph D. Martinez
Geology
Louisiana State University

Marion L. Kimmel
Petroleum Engineering
Louisiana State University

Alan H. Cheetham
Geology
Louisiana State University

ing colleges and universities. The other two fellowships not used are scheduled to be awarded in the future.

Each fellowship provides $1,250 for the school year, with an additional $300 for tuition, fees, equipment, and supplies and $500 for summer field work in geology.

With a few exceptions, the yearly distribution of the fellowships has been as follows: One each in civil engineering and mechanical engineering at The Agricultural and Mechanical College of Texas; one each in chemistry and physics at The Rice Institute; one each in chemistry, chemical engineering, and geology at The University of Texas; one each in geology and petroleum engineering at The University of Oklahoma; one each in petroleum engineering and geology at Louisiana State University; and one in chemical engineering at The Massachusetts Institute of Technology.

Humble takes no part in selecting the recipients. To the fellowships made available by the Company, participating schools appoint qualified students working on Master's and Doctor's degrees. A qualified student may be appointed more than one time, and several students have been so named.

Subjects of the theses and dissertations are selected by the students and schools. These subjects are required to be in the fields in which the fellowships are granted, but need not be related to the petroleum industry.

In accepting the fellowships, the student assumes no obligation to work for Humble. Nor does the Company assume any obligation to offer employment. The Company, however, welcomes the chance to discuss with these students their opportunities for employment with Humble.

Fourteen of the past Humble fellows have accepted jobs with the Company, and seven are employed at present in geology, civil engineering, petroleum engineering, and chemistry.

In addition to these Humble fellowships, Humble's Refining Department has set up research projects in the Chemistry Departments at Rice Institute and The University of Texas. The Rice Institute has used the funds for these projects to establish two research fellowships and The University of Texas has set up one research project.

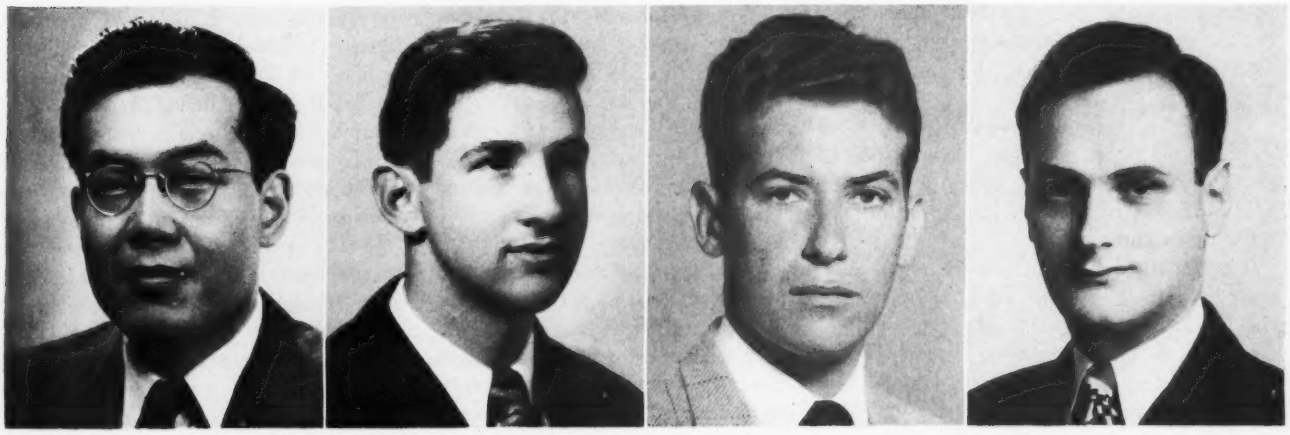
The thirteen students now holding Humble fellowships and the three working on the Refining Department's projects at Rice and Texas University are presented on these pages.

Ju-nam Chew
Chemical Engineering
The University of Texas

Stanley O. Winthrop
Chemistry
The University of Texas

Samuel Levin
Geology
The University of Texas

Erwin Kohn
Chemistry Research Project
The University of Texas



Lt. Gen. LeRoy Lutes congratulates Humble's Dr. George Bays on his winning Army's Certificate of Appreciation for service to Technical Industrial Intelligence Committee during World War II. Dr. E. F. Voss (left) won same award.

Refinery Executives Honored by Army

Certificates for patriotic service are awarded to Dr. Ernst F. Voss and Dr. George S. Bays

Dr. Ernst F. Voss, chief refinery engineer for Humble, and Dr. George S. Bays, assistant process superintendent at Baytown Refinery, recently received Certificates of Appreciation from the U. S. Army for patriotic civilian service during World War II.

The certificates were presented by Lt. Gen. LeRoy Lutes, commanding general, Fourth Army, in behalf of the Secretary of the Army, Frank Pace, Jr. The two Humble men were among six scientists so honored in the Fourth Army area.

Friends, prominent Houston civil leaders, and families of Dr. Voss and Dr. Bays witnessed the presentation held in the Board Room of the Humble Building in Houston.

The certificates were given for work done by Dr. Voss and Dr. Bays for the Technical Industrial Intelligence Committee. The committee operated under the direction of the Joint Chiefs of Staff, evaluating and reporting on technological advances made by Germany and Japan during the war.

Dr. Voss joined Humble in 1924. During World War II, he supervised the construction of Baytown's synthetic rubber plants and Baytown Ordnance Works, where toluene for TNT was made from oil. These plants were built by the government and operated by Humble.

Dr. Voss was born in Fredericia, Denmark, of Danish parents. He was graduated from a Danish high school and attended the Technical University in Aachen, Germany, during 1913 and 1914.

In 1916, he came to the United States and entered Massachusetts Institute of Technology, receiving his Bachelor of Science degree in chemical engineering in 1918.

Dr. Voss returned to Europe and entered the University of Paris, where he obtained a Doctor's degree in physical chemistry in 1923. In that same year, he returned to this country. From 1923 to 1924, he taught in the Chemical Engineering Department at M.I.T.

Dr. Bays joined Humble as senior chemical engineer in 1937. He has since held successive positions in the Technical, Operating, and Administrative departments at Baytown Refinery.

He was born in Tulsa, Oklahoma, but attended grammar and high schools in Wichita Falls, Texas. He received his Bachelor of Science degree in chemical engineering from the University of Texas.

Following his schooling at the University, Dr. Bays attended the Massachusetts Institute of Technology for three years and was awarded the advanced degrees of Master of Science and Doctor of Science in chemical engineering. For a time afterward, Dr. Bays served as instructor in chemical engineering at M.I.T.

They Have Retired

FOURTEEN employes have retired since these columns last reported. All but three of them have more than 25 years of service with the Company.

Humble Pipe Line Company — Mike Dobray, blacksmith at Pierce Junction Shop, retired November 15 after more than 27 years' service. Mr. Dobray was employed at Webster as a laborer and later worked at Hastings and Pierce Junction. He owns a trailer house and a carryall that he plans to use in traveling and fishing during his retirement.

William A. Hugg, assistant division superintendent in Operating Field, retired November 28 after more than 34 years' service. He began his career with Humble as a telegraph operator and clerk at Groesbeck. Mr. Hugg worked for the Standard Oil Company of Louisiana and the Carter Oil Company before joining Humble. He includes among his special interests football, fishing, gardening and flower raising. He plans to remain active in his profession on retirement.

Goree Neelley, district clerk at Hull, retired November 3 after more than 24 years' service. He joined the Company at Hearne as a laborer. Later he worked in a variety of jobs at Bryan, Fairbanks, Mexia, Conroe, Clifton, Olney, Marlin, Groesbeck, Longview, Pierce Junction and Hull.

Albert P. Sommers, Sr., division communications & electrical maintenance man in the North Texas Division, retired November 16 after more than 26 years' service. Mr. Sommers started to work for the Company as a lineman and later worked as division lineman, T and T inspector, and C and E maintenance man.

Daniel B. Woodell, district clerk at Baytown, retired November 15 after 29 years' service. Mr. Woodell began work with Humble as a telegraph operator and gauger at Satsuma. He later worked in various capacities at Goose Creek, Baytown Refinery, and Baytown Pipe Line.

Production Department — John G. McKoy, roustabout gangpusher at London, retired October 22 after more than 30 years' service. He was employed by Humble at Breckenridge as a laborer. He also worked as a roustabout, truck driver, watchman, and gauger before becoming a roustabout gangpusher in 1935. He says that during his retirement he will do a little gardening with a power tractor, a little fishing, and lots of resting and traveling.

Harlen F. Rooks, roustabout derrickman at London, retired November 23 after more than 28 years' service. He started to work for Humble at Mexia as a roustabout helper. His hobby is fishing. Fellow employees gave him a 10-inch Crescent wrench with his name engraved on it. They gave him the wrench because of a safety habit he had of carrying a wrench while working to tighten any loose bolts he found.

Baytown Refinery — Ollie M. Bishop, helper, retired November 9 after almost 18 years' service. Mr. Bishop worked for the Humble Pipe Line Company from 1933 to 1935. He started at Baytown Refinery in the labor department, where he worked a short time before transferring to the boilermaker department. On retirement he plans to farm and do some fishing.

Robert L. Lawless, dockman, retired November 7 after almost 31 years' service. He began work in the Company's Production Department at Goose Creek. In 1927 he transferred to Baytown Refinery as a helper in the rigging department. He intends to find a small place, where he can raise a garden and farm on a small scale.

Olmir R. Skaggs, carpenter supervisor, retired October 23 after more than 21 years' service. He started to work at the Refinery as a carpenter in the carpenter department. All of his service with the Company has been spent in various capacities at Baytown Refinery. His chief interests include raising a garden and chickens and doing some hunting and fishing.

William S. Young, pumper, retired October 22 after more than 25 years' service. Mr. Young came to work at the Refinery as a helper. Later he worked as a pumper, gauger, helper, and rackman. He is a baseball fan and fisherman.

Houston Office — Frank A. Huwieler, accountant in Refining Accounting, retired October 26 after 31 years' service. Mr. Huwieler joined Humble as a timekeeper at Baytown Refinery. He worked at Baytown while the Refinery was being constructed. In 1926 he transferred to the Refining Accounting Office in Houston. Baseball, football, and fishing are his hobbies. He plans to enter a small business of his own on retirement.

David P. Olcott, head of Statistics & Evaluation Section in Exploration-Geologic, retired December 1 after 30 years' service. Before joining Humble as a geologist in 1927, Mr. Olcott spent five years in Venezuela with the Standard Oil Company of Venezuela. He was named head of the Statistical & Evaluation Section in 1933. He has opened an office in the Esperson Building in Houston to do some consulting work.

Monroe V. Fleming, janitor in Building Maintenance, retired October 30 after more than 29 years' service. His entire career with Humble has been spent with Building Maintenance. His special interests include gardening and raising chickens. He also intends to contract small jobs of painting and carpentering.

Deaths

Since the last issue of THE HUMBLE WAY, ten active employees and four annuitants have died.

Active employees, who have died are: Noble J. Blount, 44, truck driver at Scott and Hopper District, on November 18; Rufus D. Cagle, 59, janitor in the Houston Office, on November 14; Reginald L. Dacey, 43, production geologist in the Exploration Department's Gulf Coast Division, on September 19; Leonard W. Hancock, 56, helper in Exploration-Geophysics at King Ranch, on September 25; Hubert W. Hargon, 50, assistant to department head in the Marine Department's Houston Office, on Novem-

(Continued on Page 28)

By the way . . .

Ray H. Horton, Manager of Employee Relations Department and Building Chairman for Houston's United Fund, points proudly to quota-breaking subscription of Humble employees to the local drive in which 51 agencies combined their fund-raising appeals. Looking on are President Hines H. Baker, Chairman of the Board of Trustees for the United Fund, and Vice President H. W. Ferguson, Chairman of the Industrial Division. Final figure was even higher than the total shown here.

Stockholders Vote Change In Number of Shares

At a meeting on October 25, 1951, the stockholders authorized an increase in the number of shares of stock in Humble Oil & Refining Company from 18,000,000 to 36,000,000 shares. The last preceding change in the number of shares was in 1943. Since that time, the investment in the Company by stockholders has more than doubled, having increased to $832,941,900 as of June 30, 1951. There has also been a large expansion in the assets and operations of the Company. The change was recommended to stockholders by the Board of Directors for the preceding reasons and because it should broaden the market for the stock of the Company.

Wins ASCE Award

Edgar G. Baugh, 28-year-old associate civil engineer in Humble's Gulf Coast Division, has been named winner of the 1951 Daniel W. Mead Prize, an annual writing award of the American Society of Civil Engineers.

This was the first time Mr. Baugh had entered the nationwide competition, which is restricted to junior members of ASCE. The title of his prize-winning paper was "Why Is a Code of Professional Ethics Desirable?"

Presentation of a certificate and a cash award of $50 will be made to Mr. Baugh at the association's spring convention in New Orleans, March 5-7, 1952.

Deaths— (Continued from Page 27)

ber 7; Frank P. Kidd, 32, rotary derrickman at Lovell Lake, on October 5; Wallace C. Lamonte, 22, reproduction operator in Stationery, Printing in the Houston Office on military leave, on October 6; Kay C. Langston, 53, roustabout gangpusher at Odessa, on November 15; James R. Mixon, 40, helper at Baytown Refinery, on October 26; Jones T. Nixon, 47, machinist first at Baytown Refinery, on October 16.

Annuitants: Cleve Carlton, 66, pump repairman at Baytown Refinery before his retirement, died on October 5; Ralph V. Hanrahan, 66, President of Humble Pipe Line Company before his retirement, died on October 11; John P. Johnson, 70, warehouse clerk at Webster before his retirement, died on November 18; Louis W. Welch, 68, janitor at Baytown Refinery before his retirement, died on November 18.

The HUMBLE WAY

Vol. VII No. 4

NOVEMBER-DECEMBER
1951

It's Wise to Have a Will..... 1
Built to Purify..... 4
Gunning for More Oil..... 6
Mississippi Moves Up.....10
Mississippi Oil in Art.....13
Watercolors and pencil sketch by E. M. Schiwetz
Big Reactor Job.....17
Taking an Oil Well's Temperature.19
Texas Stagecoach Inns.....22
Sketches by E. M. Schiwetz
Humble Fellowships 24
Refinery Executives Honored by Army 26
They Have Retired.....27
By the Way.....28

Published every other month for employees and stockholders

HUMBLE OIL & REFINING COMPANY

P. O. Box 2180, Houston 1, Texas

Board of Directors

L. T. Barrow, *Chairman*

Hines H. Baker — Rex G. Baker
David Frame — H. W. Ferguson
D. B. Harris — Morgan J. Davis
J. A. Neath — C. E. Reistle, Jr.
Richard J. Gonzalez

Officers

Hines H. Baker, *President*
L. T. Barrow, *Chairman*
David Frame, *Vice President*
D. B. Harris, *Vice President and Treasurer*
J. A. Neath, *Vice President*
Rex G. Baker, *Vice President and General Counsel*
H. W. Ferguson, *Vice President*
Morgan J. Davis, *Vice President*
Gay Carroll, *Comptroller*
H. K. Arnold, *Secretary and Assistant Treasurer*
Nelson Jones, *General Attorney*

Permission for reproduction of articles and pictures contained herein will be granted freely if credit is given and the request is made of the Editor, The Humble Way, P. O. Box 2180, Houston 1, Texas.

Picture Credits: Inside front cover and those on Pages 4, 5, 16, 17 and 18 by R. B. Jacobs; Pages 6 through 11, the bottom picture on 12, Pages 20 and 21 and inside back cover by Staff Photographer Mel Coston; two top pictures on Page 12 from Mississippi Agricultural and Industrial Board; Pages 19 and 26 by T. E. Nowlin.

Art Credits: The cover painting and Pages 13, 14 and 15 and Pages 22 and 23 by E. M. Schiwetz; Pages 1, 2 and 3 by Harris Goode; Page 9 by Hal Jones.

Putting a thermometer in an oil well. See page 19.

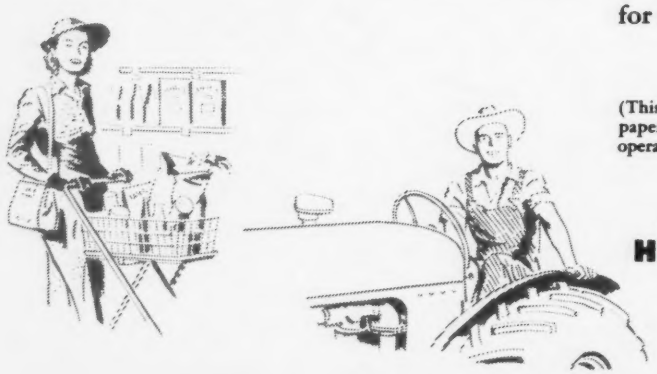
What does oil mean to *me*?

THE development and conservation of our nation's oil resources mean a lot to you.

Oil means gasoline for your car, power for factories that produce the goods you use, fuel to keep you warm, and strength in the sinews of national defense.

Oil has an economic meaning for you, too. The value of crude oil produced in the United States in 1950 was about 5 billion dollars. This is *productive* money. It pays taxes, salaries, and wages; it buys equipment and supplies; it helps build schools and highways; it goes to landowners as royalty and lease payments, to stockholders as dividends. A heavy percentage of it is reinvested in the further development of the nation's petroleum resources, to make sure you will have oil for the future.

Productive money. It means progress, not only for the oil industry, but for you!



(This advertisement is one of a series which has been appearing in newspapers and magazines in the territory in which Humble carries on its operations.)

HUMBLE OIL & REFINING CO.
HUMBLE PIPE LINE CO.